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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,532	07/17/2003	Jill P. Card	IBX-005	2468

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EXAMINER	
STEVENS, THOMAS H	

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 09/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/621,532	CARD ET AL.	
	Examiner	Art Unit	
	Thomas H. Stevens	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/03/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Clams 1-27 were examined.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected due to its length of less than 50 words. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

> invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Card et al., (US Patent 6,810,291, hereafter Card) in view of Edwards et al., (US Patent 5,495,554, hereafter Edwards).

Card teaches scalable hierarchical control for complex systems (title) with time-varying process metrics (Card: column 1, lines 31 and 51); but fails to teach orthogonal transforms. Edwards teaches analog wavelet transforms (title) with orthogonal transforms (Edwards: column 1, line 18).

Card and Edward are analogous art since they both teach time-varying functions involving electronic circuitry.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention was made to utilize the digital wavelet of Edwards in the cost function of Card because Edwards teaches a method to provided an improved wavelet transform chip (Edwards: column 1, lines 39 and 40).

Claim 1. A method of prediction of a process having an associated process metric (Card: column 1, line 51), the method comprising the steps of: (a) obtaining time-varying (Card: column 1, line 31) measurements of parameters (Card: column 1, lines 66-67)relating to the process; (b) decomposing the time-varying (Card: column 1, line 31) measurements into discrete measurement values using an orthogonal (Edwards: column 1, line 18) transform; and (c) modeling a relationship between the discrete measurement values and the associated process metric (Card: column 1, line 51) to determine a predicted process metric (Card: column 1, line 51) value from an input set of discrete measurement values.

Claim 2. The method of claim 1 wherein the modeling step comprises building a nonlinear regression (Card: column 1, line 44)model of the relationship between the discrete measurement values and the associated process metric (Card: column 1, line 51) to determine the predicted process metric (Card: column 1, line 51) value.

Claim 3. The method of claim 1 wherein the orthogonal (Edwards: column 1, line 18) transform is a Fourier (Edwards: column 3, lines 20-23) transform.

Claim 4. The method of claim 1 wherein the orthogonal (Edwards: column 1, line 18) transform is a wavelet (Edwards: abstract) transform.

Claim 5. The method of claim 1 further comprising the steps of: (d) providing at least

one range of acceptable discrete measurement values to define a constraint (Card: column 1, line 49) set; (e) identifying a plurality of input process variable values that produce discrete measurement values within the constraint (Card: column 1, line 49) set; and (f) using the modeled relationship in conjunction with an optimizer (Card: column 12, line 57) to determine the discrete measurement values, produced by the input process variable values, that produce a predicted process metric (Card: column 1, line 51) value substantially as close (Card: column 23, lines 7 and 8) as possible to a target process metric (Card: column 1, line 51) value.

Claim 6. The method of claim 5, further comprising the step of repeating steps (a)-(e) for at least one sub-process (Card: column 12, line 55) of the process.

Claim 7. The method of claim 5, further comprising the step of repeating steps (a)-(e) for a higher-level process comprising a plurality of the processes (Card: column 12, line 56).

Claim 8. The method of claim 1 wherein the input set of discrete measurement values is obtained by decomposing time-varying (Card: column 1, line 31) measurements into discrete measurement values using an orthogonal (Edwards: column 1, line 18) transform.

Claim 9. An article of manufacture having a computer (Card: column 20, lines 60-63)-readable medium with computer (Card: column 20, lines 60-63)-readable instructions

embodied thereon for performing the method of claim 1.

Claim 10. A method of prediction and optimization of maintenance (Card: column 15, line 32) actions for a process, the method comprising the steps of: (a) obtaining time-varying (Card: column 1, line 31) measurements of parameters (Card: column 1, lines 66-67)relating to the process; (b) decomposing the time-varying (Card: column 1, line 31) measurements into discrete measurement values using an orthogonal (Edwards: column 1, line 18) transform; and (c) modeling a relationship between at least one maintenance (Card: column 15, line 32) variable and the discrete measurement values to determine predicted measurement values from an input set of maintenance (Card: column 15, line 32) variable values.

Claim 11. The method of claim 10 wherein the modeling step comprises building a nonlinear regression (Card: column 1, line 44)model of the relationship between at least one maintenance (Card: column 15, line 32) variable and the discrete measurement values to determine the predicted measurement values.

Claim 12. The method of claim 11 wherein the nonlinear regression (Card: column 1, line 44) model maps a relationship between (i) a plurality of maintenance (Card: column 15, line 32) variables and associated process inputs, and (ii) discrete measurement values, the nonlinear regression (Card: column 1, line 44) model being used to determine a predicted measurement value from an instance of the input set of

maintenance (Card: column 15, line 32)-variable values.

Claim 13. The method of claim 12 wherein the orthogonal (Edwards: column 1, line 18) transform is a Fourier (Edwards: column 3, lines 20-23) transform.

Claim 14. The method of claim 12 wherein the orthogonal (Edwards: column 1, line 18) transform is a wavelet (Edwards: abstract) transform.

Claim 15. The method of claim 12 further comprising the steps of: (d) providing at least one range of acceptable values for at least one maintenance (Card: column 15, line 32) variable to define a constraint (Card: column 1, line 49) set; and (e) using the modeled relationship in conjunction with an optimizer (Card: column 12, line 57) to determine values for the at least one maintenance (Card: column 15, line 32) variable within the substantially as close (Card: column 23, lines 7 and 8)constraint (Card: column 1, line 49) set that produce at least one predicted discrete measurement value substantially as close (Card: column 23, lines 7 and 8) as possible to a target discrete measurement value.

Claim 16. The method of claim 15, wherein costs are associated with at least one of the maintenance (Card: column 15, line 32) values used by the optimizer (Card: column 12, line 57).

Claim 17. The method of claim 10 further comprising modeling a relationship between (i) an input set comprising at least one maintenance (Card: column 15, line 32) variable and the discrete measurement values and (ii) the process inputs in order to determine a predicted process metric (Card: column 1, line 51) value from an instance of the input set.

Claim 18. An article of manufacture having a computer (Card: column 20, lines 60-63)-readable medium with computer (Card: column 20, lines 60-63)-readable instructions embodied thereon for performing the method of claim 10.

Claim 19. A system for predicting a process having an associated process metric (Card: column 1, line 51), comprising: (a) a process monitor for monitoring time-varying (Card: column 1, line 31)measurements relating to process metrics (Card: column 1, line 51); and (b) a data processing device for predicting the process by (i) decomposing the time-varying (Card: column 1, line 31) measurements into discrete measurement values using an orthogonal (Edwards: column 1, line 18) transform, and (ii) modeling a relationship between the discrete measurement values and the associated process metric (Card: column 1, line 51) to determine a predicted process metric (Card: column 1, line 51) from an input set of discrete measurement values.

Claim 20. The system of claim 19 further comprising a process controller, responsive to the data processing device, for adjusting at least one of the processes (Card: column 12, line 56) based on the predicted process metric (Card: column 1, line 51).

Claim 21. The system of claim 19 further comprising a data storage device (Card: column 23, line 9) for providing at least one range of acceptable discrete measurement values.

Claim 22. The system of claim 21 further comprising an optimizer (Card: column 12, line 57) for determining values for the process inputs that (i) produce predicted discrete measurement values substantially as close (Card: column 23, lines 7 and 8) a possible to a target value provided by the data storage device (Card: column 23, line 9).

Claim 23. The system of claim 22 wherein the optimizer (Card: column 12, line 57) is a feature of the data processing device.

Claim 24. A system for predicting and optimizing maintenance (Card: column 15, line 32) actions for a process, comprising: (a) a process monitor for monitoring time-varying (Card: column 1, line 31)measurements of parameters (Card: column 1, lines 66-67)relating to the process; and (b) a data processing device for predicting the process by (i) decomposing the time-varying (Card: column 1, line 31)measurements into discrete measurement values using an orthogonal (Edwards: column 1, line 18) transform and (ii) modeling a relationship between at least one maintenance (Card: column 15, line 32) variable and the discrete measurement values to determine predicted measurement values from an input set of maintenance (Card: column 15, line 32) values.

Claim 25. The system of claim 24 further comprising a process controller, responsive to the data processing device, for adjusting at least one of the processes (Card: column 12, line 56) based on the predicted process metric (Card: column 1, line 51).

Claim 26. The system of claim 24 further comprising a data storage device (Card: column 23, line 9) for providing at least one range of acceptable discrete measurement values.

Claim 27. The system of claim 26 further comprising an optimizer (Card: column 12, line 57) for determining measurement values that (i) produce a predicted process metric (Card: column 1, line 51) value substantially as close (Card: column 23, lines 7 and 8) a possible to a target process metric (Card: column 1, line 51), and (ii) are within the at least one range of acceptable values for the discrete measurement values provided by the data storage device (Card: column 23, line 9).

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mr. Tom Stevens whose telephone number is 571-272-3715, Monday-Friday (8:00 am- 4:30 pm EST).

If attempts to reach the examiner by telephone are unsuccessful, please contact examiner's supervisor Mr. Paul Rodriguez 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov.. Answers to questions regarding access to the Private PAIR system, contact the Electronic Business Center (EBC) (toll-free (866-217-9197)).

September 14, 2006

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9/15/06